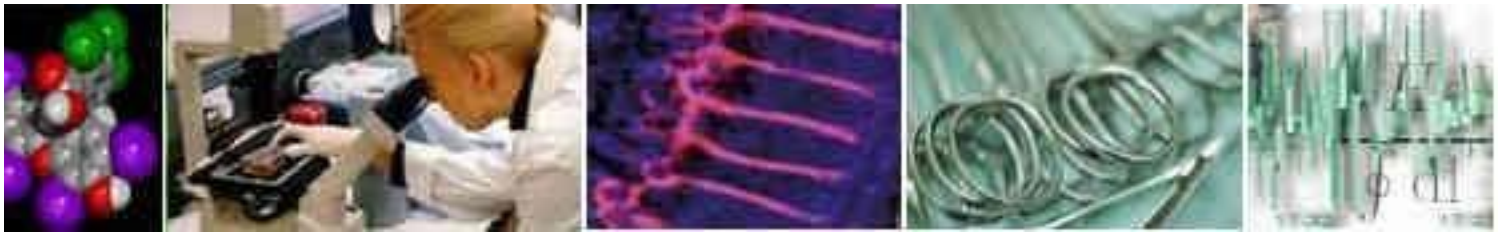
KEELE UNIVERSITY



3ME INITIATIVE Modelling Methods for Medical Engineering

How to herd cats and make them work together to catch mice!

Tsianghua University November 2011

3ME Specific Objectives:

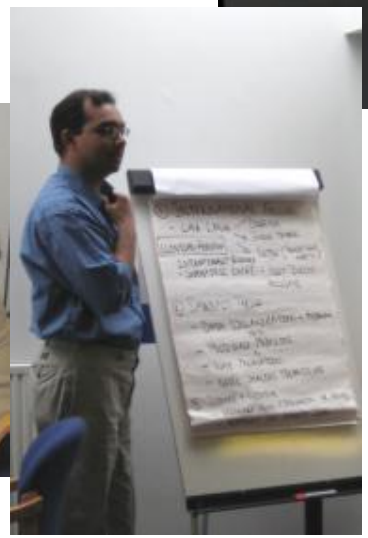
"1. Create an interdisciplinary environment and culture that enables Keele researchers to work together in small groups on new common interest areas across Institutes – ISTM/EPSAM

2. Host international senior research visitor and visits to enhance the research skills of Keele and the UK's capability in medical engineering

3. Invest to start up new key collaborative cross-disciplinary projects."

Starting the programme…

<u>Opening meeting</u> – March 2008:



30 participants

Combination of exotic food and “Speed dating”

3ME Initiative - Modelling Methods for Medical Engineering

Back to Back Seminars

- Prof Patrik Spanel– *Methane as a diagnostic in the breath of patients*

Keele/Prague

- Prof Euan Nisbet – '*Atmospheric methane – the quiet giant'*

Royal Holloway

Sandpit meetings

September 2008, 2009, 2011







An isolated hotel, visiting speakers, breakouts. And…

3ME Initiative - Modelling Methods for Medical Engineering

www.keele.ac.uk/research/3me

Creativity @Home

EPSRC Life Sciences Interface Programme

Trentham Monkey Forest, Stoke

Providing a ‘facilitator’ for 3 days to assist in ‘creative thinking’
Know Innovation – Tim Morley

Pump-priming

15-20 pump-primed projects, average £5,000.

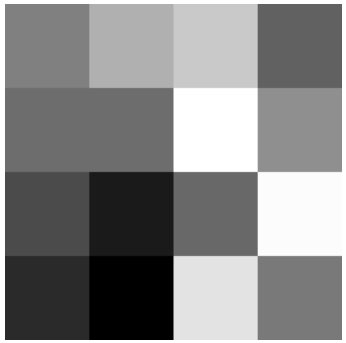
Sandpit Project -

'FACE'

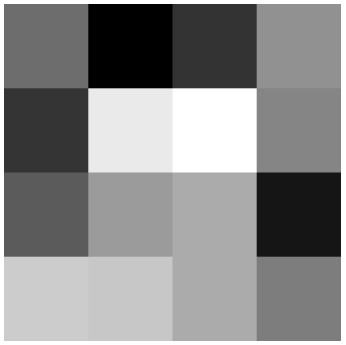
Fractal analysis in clinical cell therapies

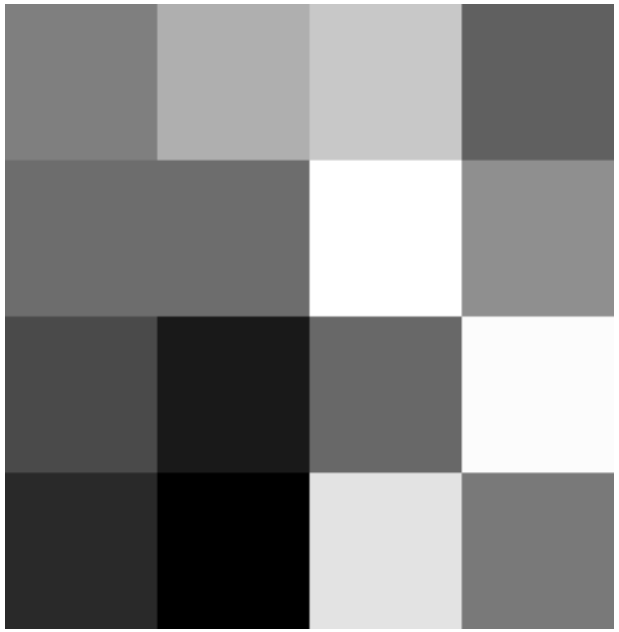
Collaboration between Orthopaedics Computer science and geophysics

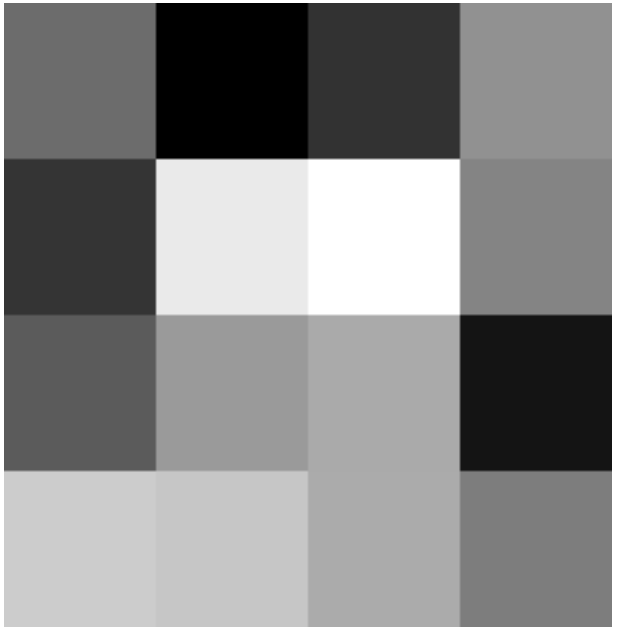
- 6 week funded project



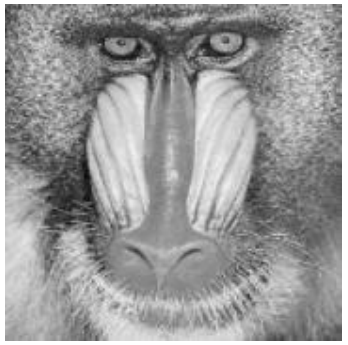
Start



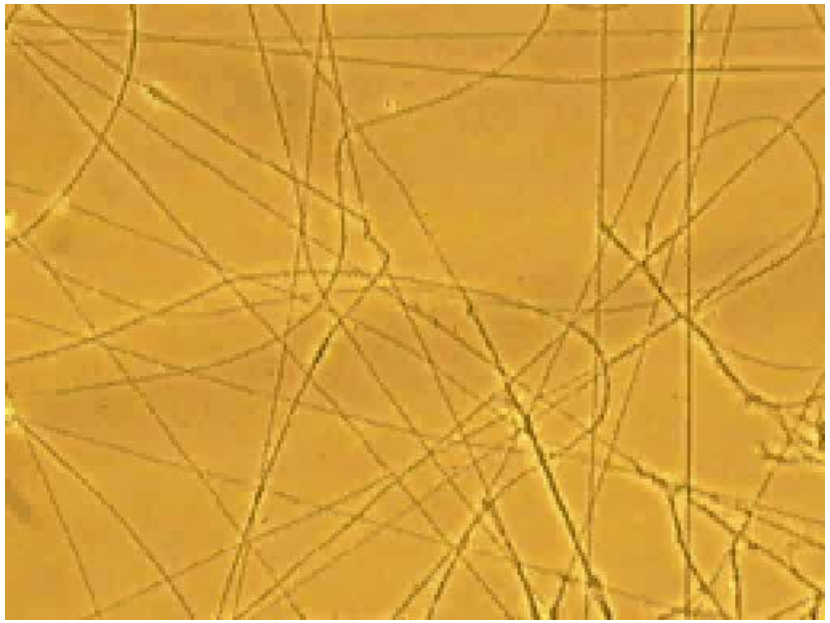


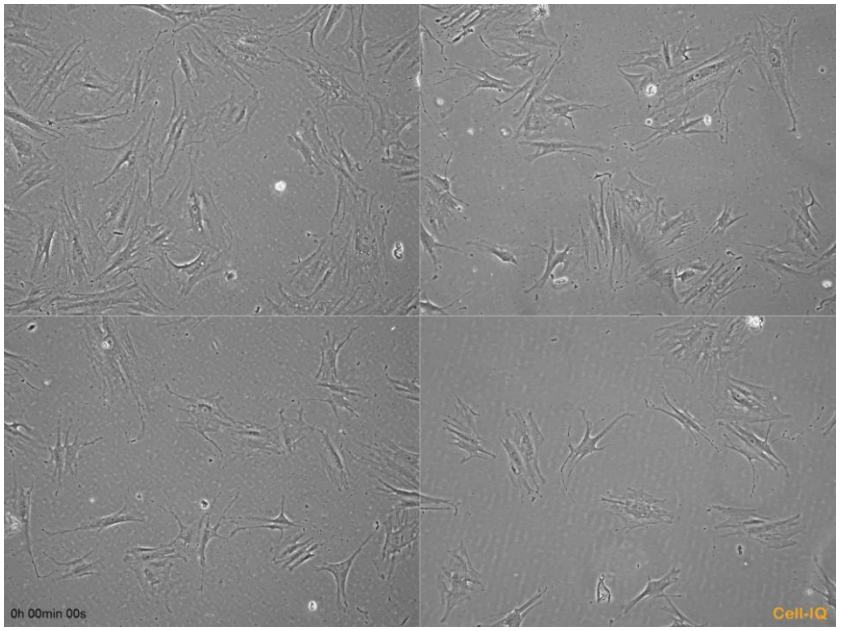


End



Cell behaviour analysis
ex. Guiding cells using fibres





Follow on collaborations with industry – Cell IQ

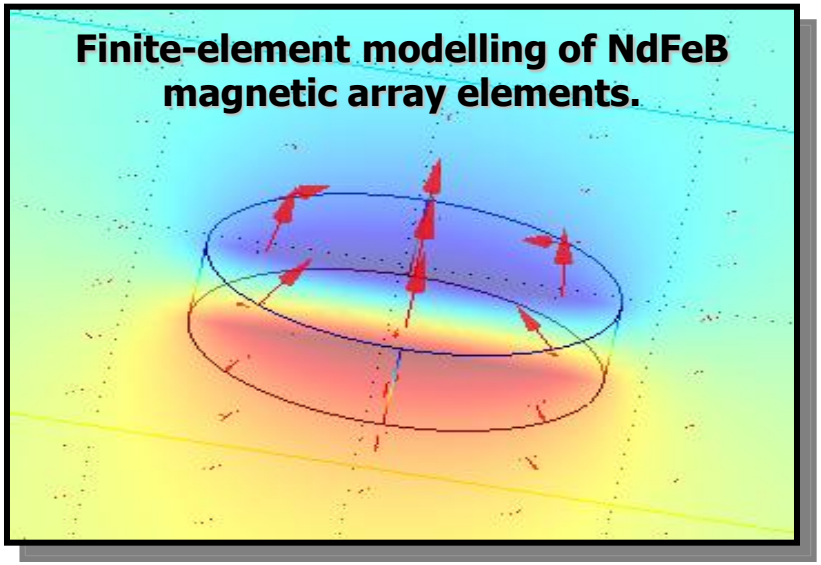
Nigel Cassidy, Researcher in Residence…

A geophysicist discipline hopping into the tissue engineering arena.

Utilising his electromagnetic modelling skills for research into cell stimulation in bio-reactors.

"a valuable and unique opportunity to experience and develop research in a new discipline – extremely rewarding and very enjoyable"

Finite-difference modelling used for the design of electrical stimuli in bio-reactors



International programme – visitors and visits to key labs abroad

The study of effects of pore architecture in chitosan scaffolds on the fluid flow pattern by Doppler OCT

Ying Yang[1], Andreea Iftimia[1], Yali Jia[2], Toby Gould[1], Alicia El Haj[1], Ruikang K Wang[2]

[1]Institute of Science & Technology in Medicine, Keele University, Stoke-on-Trent, ST4 7QB, UK

[2]Department of Biomedical Engineering, Oregon Health & Science University, 3303 SW Bond Avenue, Portland OR97239, USA

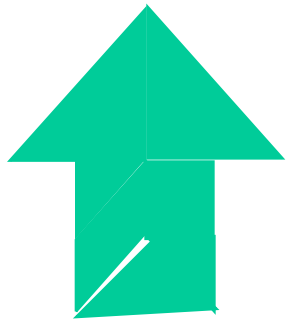
Connectivity to other EPSRC Programmes and other links

- EPSRC Doctoral Training Centre in Regenerative Medicine - PhD summer school/ 1st year 6 week projects
- EPSRC Creativity at Home Scheme Workshop
- BBSRC Modular Training for Industry Programme
- Links to EU IRSES exchange programmes with China FPVI Network of Excellence EXPERTISSUES
- EPSRC Innovative Manufacturing Centre in Regen Med - Metrology

The End Stages

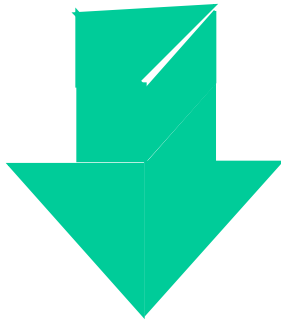
- ‘Face to Face’ programme – clinical focus
- July PhD Summer school
- Completed pump priming projects
- Closing BTG Retreat planned April
- Grant submissions
- Publications

Practical benefits



- We now know size and shape of the “gap”.
- Established cross-disciplinary community between faculties (and even some on the same corridor).
- Understanding of the specialised language
- Involvement of clinical staff /database.
- Awareness of cross facilities and infrastructure
- International ongoing links and speakers/fellows.
- Links to other projects allows for continuations of activities.

Challenges, failures …?



- Internet “chat room” and industry forum has not taken off. Other routes work better
- Easy to introduce and connect academics but not so easy to spark innovative ideas or make leaps...
- Is pump priming short term projects enough to reach a stage for a full proposal to RC ?
- Lacking intermediate step in funding...
- Freeing up clinicians time to follow through

The Legacy at Keele

- Clinical database available to scientists
- A new breed of academic?
- Ongoing grant collaborations
  Feasibility, Industrial, DTC
- Publications
- Awareness and impact

How do we measure the ultimate "impact"?

1. New and cost-effective treatments for human disease using regenerative medicine therapies,

2. A patients' quality of life as a result of successful interventions

3. The ultimate growth of the UK industrial and manufacturing base in Medical Engineering.

4. Engineering researchers at a wider level, including the next generation of students seeking to apply engineering solutions to healthcare problems.

5. Mathematics researchers through application of modelling to novel, relevant fields.

6. Geophysics researchers through the mutual development of modelling and imaging techniques.

3ME Contacts

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www.keele.ac.uk/research/3me